With five MA B-readers there are ten possible pairings of MA B-readers, when each reads the same sets of films as the other. Each of the ten tables carries the same information: the cross classification of the findings of the underlying disease process by the two MA B-readers, with both the number of cases and the percents of all cases for each cell (denoted (a) tables). In addition, there are two subtables for each of these ten combinations that report the same comparisons between MA B-reader pairs, but subclassified by pleural disease (denoted (b) tables) and interstitial disease (denoted (c) tables). Further, each of these subtables reports the rates (proportions) of agreement, disagreement, and extreme disagreement between the two B-readers. We defined "extreme disagreement" as the case of when one MA B-reader found bilateral pleural or bilateral interstitial disease, while the other MA B-reader found (i) an unreadable or negative film, (ii) no pleural abnormalities in the case of bilateral pleural disease, and (iii) no parenchymal abnormalities in the case of bilateral interstitial disease. "Exact agreement" was defined as those cases in which both MA B-readers classified the same film in exactly the same manner. "Some disagreement" referred to those cases in which the MA B-readers disagreed, but not in the extreme, as we have just defined.

In the case of the pleural disease subtables ((b) tables), the number of claims with bilateral pleural disease in these tables may be larger than the number of claims identified as having BPD in the MA B-reader's UDP tables ((a) tables). This is due to the fact that cases defined as BILD in the UDP tables are claims where the B-reader found BILD only or BPD in addition to BILD. Hence, since BILD is considered more severe, the claims where a B-reader determines both BPD and BILD were classified as BILD for the underlying disease process.

These 10 sets of tables reveal that for some pairs of MA B-readers, the rates of disagreements were substantial. For pleural disease, rates of extreme disagreement ranged from 8% to 55%. For interstitial disease, the comparable range was from 3% to 36%. In some cases (for example, Table 12c), part of the reason for the rates of disagreement lies in the fact that one of the MA B-readers (reader C in this example) did not find any interstitial disease. Corroborating this finding about reader C are the results in Table 15c, in which reader C again found no interstitial disease in 138 cases, for which the other reader (3) found at least some disease in 91 cases (66%). As we reported earlier, high levels of agreement are possible only when the B-readers exhibit similar "calibration" in their propensity to identify a disease process.

c.   Summary

Two conclusions may be drawn from these ancillary results. First, the MA B-readers seemed to operate under very different opinions about the threshold of medical evidence needed to judge disease. We did not have any data from which to explain the reasons for these differences. Second, the same case when reviewed by different MA B-readers led to

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different conclusions. The frequency of this difference of opinions varied widely by the reviewer pair, suggesting again that the calibrations of the MA B-readers varied, in some cases widely.

VII Comments

We have found that, as anticipated, Category of the claim was an important predictor of whether there was a dispute (in the determination of disease process) between claimant and the MA B-reader. We also found, not surprisingly, that law firm and/or physician also explained to a large degree the chances of a dispute between claimant and Trust on the issue of the UDP. With sufficient data relative to the number of law firms and physicians, one could identify those law firms, physicians, or combinations that had statistically significant higher (or lower) rates of dispute.

We found that the agreement between the disease process alleged by the claimant and that as found by the MA B-reader depended on the assignment of MA B-reader to the x-ray audit. This comment is supported by Tables 11-20. We must place these findings in context, however. To some extent the same conclusion applies to any exercise in clinical decision-making in which a diagnosis or clinical determination must be based on expert judgment, and that expert judgment reflects highly variable subjective opinion. It is common for physicians who are making subjective opinions to differ widely on the question of the pre ence of disease (Kopans 1994, Wagner 1993, Amfield 1992, Parker 1989, Ducatman 1 '88, Felson 1973). Clinicians sometimes exhibit different rates of finding disease. For example, the Occupational Health Department of the U.S. Navy conducted an analysis of 10,000 reviews of x-rays done by civilian B-readers (Ducatman 1988). In a randomly assigned set of x-ray interpretations, it found a 300-fold variation among B-readers in their rates of identification of definite parenchymal opacifications (defined as an ILO score of greater than or equal to 1/1), from 0.02% to 7.55%. NIOSH certification examination instructors, who participated as Navy B-readers, also varied in their rates of finding disease, but with a narrower range (from 0.17% to 1.29%, only a 7-fold variation). The Navy found a two-fold regional variance as well (region of origin of the B-reader). Although one might expect some variation in such a low prevalence finding (overall rate was about 1.2%), the variation remains wide. Even with the elimination of an "outlier" reader, the individual and regional variations continued to appear.

The level of agreement among some of the MA B-reader pairs in this study was poor by any clinical or statistical standard. The extreme case appears in the complete disagreement between readers B and C in their judgments on interstitial abnormalities (Table 15c). Such levels of disagreement, in our experience, would lead immediately in a clinical or research setting to a search for a method of reducing the degree of disagreement, either through further training of readers or through consensus development methods. A description of these methods lies well beyond the scope of this report, however.

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For there to be high levels of agreement on individual cases, physicians must find disease at the same rate in any sample of cases. For example, if as in the present case, some MA B-readers are disputing 70% of the cases while other are disputing less than 30%, they will disagree on about 40% of all cases. Not all disparities between the MA B-reader pairs were this striking.

Even when they have similar rates of finding disease, however, B-readers might still differ on individual cases (Parker 1989)[1]. From the present data, we cannot estimate the level of improvement in agreement if all MA B-readers exhibited identical calibrations in finding disease in the sample of x-rays. Given the extremes in the rates of dispute by MA B-readers, there is ample room for improvement among these five MA B-readers.

In spite of these findings, and those involving other studies of B-reader performance, our early analyses suggested that the use of certified B-readers by the claimants decreased the likelihood of a dispute with the MA B-readers. As evidence for this statement, we point to a preliminary finding that those claimants whose diagnoses were made by certified B-readers, rather than by non B-readers, had a 25% higher odds of passing the Trust's medical audit (even after adjusting for the other factors that might affect the chances of passing the audit). Although these data were not sufficient to assess "success" rates among individual B-readers (used by the claimants), they did suggest perhaps that B-readers as a group are more likely to agree among themselves than with other physicians performing the same evaluations of x-rays.

We should comment on the potential impact of disagreement among MA B-readers on the Trust's x-ray audit process. The effect of differing propensities to dispute claims by MA B-reader depends on whether one considers the impact on an individual claimant or on groups of claims, as would be filed by a law firm. For the individual claimant, the assignment of MA B-readers, even at random, can have a substantial impact on the final result of the Medical Audit for that claim. This result follows clearly from the different calibrations of MA B-readers in their rates of finding an UDP. By contrast, for groups of claims, these differences among MA B-readers will offset each other. If there were completely random allocation of claims (by law firm or physician) to the MA B-readers, any differences in treatment at the law firm or physician level would attenuate over time and with large numbers of cases.

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[1] A comparison of Table 1 and Table 2 in the Parker 1989 study highlights this point. When the two rates differed little in their rates of finding pleural thickening (54% vs 50%), the ratio of the number of cases in which the two readers concurred on the presence of disease divided by the number of cases in which either reader found disease was 0.66 (107/162), indicating that two thirds of the findings of disease were agreed upon. When the two raters differed in their rates of finding disease, however, (34% vs 15%), the comparable ratio was only 0.35, indicating that in only one-third of the findings of disease was there agreement between the readers.

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Table 11a. Comparing UDP between B-reader A and B-reader B when reviewing the same x-rays regardless of whether a first or second stage evaluation.

		B-reader B's UDP		
		None a (%)	BPD a (%)	BILD a (%)
B-reader A's UDP	None	108 (43.6)	37 (14.9)	31 (12.5)
	BPD	12 (4.8)	33 (13.3)	25 (10.1)
	BILD	1 (0.4)	1 (0.4)	0 (0.0)

B-reader UDP Comparison	Type of Agreement	Proportion	Exact 95% Confidence Interval
A vs. B	Agreement	141 / 248 = 0.57	(0.50, 0.63)
	Disagreement	107 / 248 = 0.43	(0.37, 0.50)

Table 11b. Comparing Pleural Abnormality Findings between B-reader A and B-reader B when reviewing the same x-rays regardless of whether a first or second stage valuation.

		B-reader B's Pleural Abnormality Finding		
		None a (%)	Some a (%)	Bilateral a (%)
B-reader A's Pleural Abnormality Finding	None	80 (32.3)	38 (15.3)	35 (14.1)
	Some	0 (0.0)	11 (4.4)	13 (5.2)
	Bilateral	5 (2.0)	11 (4.4)	55 (22.2)

B-reader Pleural Abnormality Finding Comparison	Type of Agreement	Proportion	Exact 95% Confidence Interval
A vs. B	Agreement	146 / 248 = 0.59	(0.52; 0.65)
	Some Disagreement	62 / 248 = 0.25	(0.20, 0.31)
	Extreme Disagreement	40 / 248 = 0.16	(0.12, 0.21)

Table 11c. Comparing Interstitial Abnormality Findings between B-reader A and B-reader B
when reviewing the same x-rays regardless of whether a first or second stage evaluation.

		B-reader B's Interstitial Abnormality Finding		
		None a (%)	Some a (%)	Bilateral a (%)
B-reader A's Interstitial Abnormality Finding	None	135 (54.4)	17 (6.9)	38 (15.3)
	Some	30 (12.1)	8 (3.2)	18 (7.3)
	Bilateral	2 (0.8)	0 (0.0)	0 (0.0)

B-reader Interstitial Abnormality Finding Comparison	Type of Agreement	Proportion	Exact 95% Confidence Interval
A vs. B	Agreement	143 / 248 = 0.58	(0.51, 0.64)
	Some Disagreement	65 / 248 = 0.26	(0.21, 0.32)
	Extreme Disagreement	40 / 248 = 0.16	(0.12, 0.21)

Table 12a. Comparing UDP between B-reader A and B-reader C when reviewing the same x-rays regardless of whether a first or second stage evaluation.

		B-reader C's UDP		
		None a (%)	BPD a (%)	BILD a (%)
B-reader A's UDP	None	39 (73.6)	1 (1.9)	0 (0.0)
	BPD	4 (7.6)	6 (11.3)	0 (0.0)
	BILD	3 (5.7)	0 (0.0)	0 (0.0)

B-reader UDP Comparison	Type of Agreement	Proportion	Exact 95% Confidence Interval
A vs. C	Agreement	45 / 53 = 0.85	(0.72, 0.93)
	Disagreement	8 / 53 = 0.15	(0.07, 0.28)

Table 12b. Comparing Pleural Abnormality Findings between B-reader A and B-reader C when reviewing the same x-rays regardless of whether a first or second stage evaluation.

		B-reader C's Pleural Abnormality Finding		
		None a (%)	Some a (%)	Bilateral a (%)
B-reader A's Pleural Abnormality Finding	None	36 (67.9)	0 (0.0)	0 (0.0)
	Some	4 (7.6)	2 (3.8)	1 (1.9)
	Bilateral	4 (7.6)	0 (0.0)	6 (11.3)

B-reader Pleural Abnormality Finding Comparison	Type of Agreement	Proportion	Exact 95% Confidence Interval
A vs. C	Agreement	44 / 53 = 0.83	(0.70, 0.92)
	Some Disagreement	5 / 53 = 0.09	(0.03, 0.21)
	Extreme Disagreement	4 / 53 = 0.08	(0.00 ..)

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Table 12c. Comparing Interstitial Abnormality Findings between B-reader A and B-reader C when reviewing the same x-rays regardless of whether a first or second stage evaluation.

		B-reader C's Interstitial Abnormality Finding		
		None n (%)	Some n (%)	Bilateral n (%)
B-reader A's Interstitial Abnormality Finding	None	30 (56.6)	0 (0.0)	0 (0.0)
	Some	20 (37.7)	0 (0.0)	0 (0.0)
	Bilateral	3 (5.7)	0 (0.0)	0 (0.0)

B-reader Interstitial Abnormality Finding Comparison	Type of Agreement	Proportion	Exact 95% Confidence Interval [a]
A vs. C	Agreement	30 / 53 = 0.57	(0.42, 0.70)
	Some Disagreement	20 / 53 = 0.38	(0.25, 0.52)
	Extreme Disagreement	3 / 53 = 0.06	(0.01, 0.16)

Table 13a. Comparing UDP between B-reader A and B-reader D when reviewing the same x-rays regardless of whether a first or second stage evaluation.

		B-reader D's UDP		
B-reader A's UDP	None	None a (%)	BPD a (%)	BILD a (%)
	BPD	102 (32.7)	94 (30.1)	0 (0.0)
	BILD	9 (2.9)	79 (25.3)	0 (0.0)
		5 (1.6)	23 (7.4)	0 (0.0)

B-reader UDP Comparison A vs. D	Type of Agreement	Proportion	Exact 95% Confidence Interval
	Agreement	181 / 312 = 0.58	(0.52, 0.64)
	Disagreement	131 / 312 = 0.42	(0.36, 0.48)

Table 13b. Comparing Pleural Abnormality Findings between B-reader A and B-reader D when reviewing the same x-rays regardless of whether a first or second stage evaluation.

		B-reader D's Pleural Abnormality Finding		
B-reader A's Pleural Abnormality Finding	None	None a (%)	Some a (%)	Bilateral a (%)
	Some	47 (15.1)	51 (16.4)	74 (23.7)
	Bilateral	1 (0.3)	8 (2.6)	30 (9.6)
		3 (1.0)	6 (1.9)	92 (29.5)

B-reader Pleural Abnormality Finding Comparison A vs. D	Type of Agreement	Proportion	Exact 95% Confidence Interval
	Agreement	147 / 312 = 0.47	(0.41, 0.53)
	Some Disagreement	88 / 312 = 0.28	(0.23, 0.34)
	Extreme Disagreement	77 / 312 = 0.25	(0.--

Table 13c. Comparing Interstitial Abnormality Findings between B-reader A and B-reader D when reviewing the same x-rays regardless of whether a first or second stage evaluation.

| | | B-reader D's Interstitial Abnormality Finding | | |
		None a (%)	Some a (%)	Bilateral a (%)
B-reader A's Interstitial Abnormality Finding	None	174 (55.8)	11 (3.5)	0 (0.0)
	Some	84 (26.9)	15 (4.8)	0 (0.0)
	Bilateral	22 (7.1)	6 (1.9)	0 (0.0)

B-reader Interstitial Abnormality Finding Comparison	Type of Agreement	Proportion	Exact 95% Confidence Interval
A vs. D	Agreement	189 / 312 = 0.61	(0.55, 0.66)
	Some Disagreement	101 / 312 = 0.32	(0.27, 0.38)
	Extreme Disagreement	22 / 312 = 0.07	(0.04, 0.10)

Table 14a. Comparing UDP between B-reader A and B-reader E when reviewing the same x-rays regardless of whether a first or second stage evaluation.

		B-reader E's UDP		
		None n (%)	BPD n (%)	BILD n (%)
B-reader A's UDP	None	118 (45.0)	13 (5.0)	58 (22.1)
	BPD	17 (6.5)	22 (8.4)	24 (9.2)
	BILD	4 (1.5)	6 (2.3)	0 (0.0)

B-reader UDP Comparison	Type of Agreement	Proportion	Exact 95% Confidence Interval
A vs. E	Agreement	140 / 262 = 0.53	(0.47, 0.60)
	Disagreement	122 / 262 = 0.47	(0.40, 0.53)

Table 14b. Comparing Pleural Abnormality Findings between B-reader A and B-reader E when reviewing the same x-rays regardless of whether a first or second stage evaluation.

		B-reader E's Pleural Abnormality Finding		
		None n (%)	Some n (%)	Bilateral n (%)
B-reader A's Pleural Abnormality Finding	None	134 (51.2)	13 (5.0)	14 (5.3)
	Some	18 (6.9)	7 (2.7)	8 (3.1)
	Bilateral	21 (8.0)	4 (1.5)	43 (16.4)

B-reader Pleural Abnormality Finding Comparison	Type of Agreement	Proportion	Exact 95% Confidence Interval
A vs. E	Agreement	184 / 262 = 0.70	(0.64, 0.76)
	Some Disagreement	43 / 262 = 0.16	(0.12, 0.21)
	Extreme Disagreement	35 / 262 = 0.13	(0.09, 0.18)

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Table 14c. Comparing Interstitial Abnormality Findings between B-reader A and B-reader E when reviewing the same x-rays regardless of whether a first or second stage evaluation.

		B-reader E's Interstitial Abnormality Finding		
		None n (%)	Some n (%)	Bilateral n (%)
B-reader A's Interstitial Abnormality Finding	None	78 (29.8)	56 (21.4)	38 (14.5)
	Some	11 (4.2)	25 (9.5)	44 (16.8)
	Bilateral	7 (2.7)	3 (1.2)	0 (0.0)

B-reader Interstitial Abnormality Finding Comparison	Type of Agreement	Proportion	Exact 95% Confidence Interval
A vs. E	Agreement	103 / 262 = 0.39	(0.33, 0.46)
	Some Disagreement	114 / 262 = 0.44	(0.37, 0.50)
	Extreme Disagreement	45 / 262 = 0.17	(0.13, 0.22)

Table 15a. Comparing UDP between B-reader B and B-reader C when reviewing the same x-rays regardless of whether a first or second stage evaluation.

		B-reader C's UDP		
		None a (%)	BPD a (%)	BILD a (%)
B-reader B's UDP	None	60 (43.5)	1 (0.7)	0 (0.0)
	BPD	21 (15.2)	7 (5.1)	0 (0.0)
	BILD	45 (32.6)	4 (2.9)	0 (0.0)

B-reader UDP Comparison	Type of Agreement	Proportion	Exact 95% Confidence Interval
B vs. C	Agreement	67 / 138 = 0.49	(0.40, 0.57)
	Disagreement	71 / 138 = 0.51	(0.43, 0.50)

Table 15b. Comparing Pleural Abnormality Findings between B-reader B and B-reader C when reviewing the same x-rays regardless of whether a first or second stage evaluation.

		B-reader C's Pleural Abnormality Finding		
		None a (%)	Some a (%)	Bilateral a (%)
B-reader B's Pleural Abnormality Finding	None	45 (32.6)	0 (0.0)	1 (0.7)
	Some	43 (31.2)	1 (0.7)	1 (0.7)
	Bilateral	35 (25.4)	2 (1.5)	10 (7.3)

B-reader Pleural Abnormality Finding Comparison	Type of Agreement	Proportion	Exact 95% Confidence Interval
B vs. C	Agreement	56 / 138 = 0.41	(0.32, 0.49)
	Some Disagreement	46 / 138 = 0.33	(0.26, 0.42)
	Extreme Disagreement	36 / 138 = 0.26	(0.19, 0.34)

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Table 15c. Comparing Interstitial Abnormality Findings between B-reader B and B-reader C when reviewing the same x-rays regardless of whether a first or second stage evaluation.

		B-reader C's Interstitial Abnormality Finding		
		None a (%)	Some a (%)	Bilateral a (%)
B-reader B's Interstitial Abnormality Finding	None	47 (34.1)	0 (0.0)	0 (0.0)
	Some	42 (30.4)	0 (0.0)	0 (0.0)
	Bilateral	49 (35.5)	0 (0.0)	0 (0.0)

B-reader Interstitial Abnormality Finding Comparison	Type of Agreement	Proportion	Exact 95% Confidence Interval
B vs. C	Agreement	47 / 138 = 0.34	(0.26, 0.43)
	Disagreement	42 / 138 = 0.30	(0.23, 0.39)
	Extreme Disagreement	49 / 138 = 0.36	(0.28, 0.44)

Table 16a. Comparing UDP between B-reader B and B-reader D when reviewing the same x-rays regardless of whether a first or second stage evaluation.

		B-reader D's UDP		
		None n (%)	BPD a (%)	BILD n (%)
B-reader B's UDP	None	178 (25.0)	132 (18.5)	1 (0.1)
	BPD	32 (4.5)	182 (25.6)	1 (0.1)
	BILD	61 (8.6)	125 (17.6)	0 (0.0)

B-reader UDP Comparison	Type of Agreement	Proportion	Exact 95% Confidence Interval
B vs. D	Agreement	360 / 712 = 0.51	(0.47, 0.54)
	Disagreement	352 / 712 = 0.49	(0.46, 0.53)

Table 16b. Comparing Pleural Abnormality Findings between B-reader B and B-reader D when reviewing the same x-rays regardless of whether a first or second stage evaluation.

		B-reader D's Pleural Abnormality Finding		
		None a (%)	Some a (%)	Bilateral a (%)
B-reader B's Pleural Abnormality Finding	None	71 (10.0)	79 (11.1)	83 (11.7)
	Some	19 (2.7)	54 (7.6)	99 (13.9)
	Bilateral	20 (2.8)	28 (3.9)	259 (36.4)

B-reader Pleural Abnormality Finding Comparison	Type of Agreement	Proportion	Exact 95% Confidence Interval
B vs. D	Agreement	384 / 712 = 0.54	(0.50, 0.58)
	Some Disagreement	225 / 712 = 0.32	(0.28, 0.35)
	Extreme Disagreement	103 / 712 = 0.14	(0.12, 0.17)

Table 16c. Comparing Interstitial Abnormality Findings between B-reader B and B-reader D when reviewing the same x-rays regardless of whether a first or second stage evaluation.

		B-reader D's Interstitial Abnormality Finding		
		None n (%)	Some n (%)	Bilateral n (%)
B-reader B's Interstitial Abnormality Finding	None	407 (57.2)	13 (1.8)	1 (0.1)
	Some	95 (13.3)	9 (1.3)	1 (0.1)
	Bilateral	162 (22.8)	24 (3.4)	0 (0.0)

B-reader Interstitial Abnormality Finding Comparison	Type of Agreement	Proportion	Exact 95% Confidence Interval
B vs. D	Agreement	416 / 712 = 0.58	(0.55, 0.62)
	Some Disagreement	133 / 712 = 0.19	(0.16, 0.22)
	Extreme Disagreement	163 / 712 = 0.23	(0.20, 0.26)

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Table 17a. Comparing UDP between B-reader B and B-reader E when reviewing the same x-rays regardless of whether a first or second stage evaluation.

		B-reader E's UDP		
		None a (%)	BPD a (%)	BILD a (%)
B-reader B's UDP	None	147 (29.6)	5 (1.0)	13 (2.6)
	BPD	99 (20.0)	60 (12.1)	22 (4.4)
	BILD	110 (22.2)	40 (8.1)	0 (0.0)

B-reader UDP Comparison	Type of Agreement	Proportion	Exact 95% Confidence Interval
B vs. E	Agreement	207 / 496 = 0.42	(0.37, 0.46)
	Disagreement	289 / 496 = 0.58	(0.54, 0.63)

Table 17b. Comparing Pleural Abnormality Findings between B-reader B and B-reader E when reviewing the same x-rays regardless of whether a first or second stage evaluation.

		B-reader E's Pleural Abnormality Finding		
		None a (%)	Some a (%)	Bilateral a (%)
B-reader B's Pleural Abnormality Finding	None	124 (25.0)	5 (1.0)	3 (0.6)
	Some	77 (15.5)	16 (3.2)	9 (1.8)
	Bilateral	128 (25.8)	24 (4.8)	110 (22.2)

B-reader Pleural Abnormality Finding Comparison	Type of Agreement	Proportion	Exact 95% Confidence Interval
B vs. E	Agreement	250 / 496 = 0.50	(0.46, 0.55)
	Some Disagreement	115 / 496 = 0.23	(0.20, 0.27)
	Extreme Disagreement	131 / 496 = 0.26	(0.23, 0.31)

Table 17c. Comparing Interstitial Abnormality Findings between B-reader B and B-reader E when reviewing the same x-rays regardless of whether a first or second stage evaluation.

| | | B-reader E's Interstitial Abnormality Finding | | |
		None n (%)	Some n (%)	Bilateral n (%)
B-reader B's Interstitial Abnormality Finding	None	158 (31.9)	87 (17.5)	29 (5.9)
	Some	36 (7.3)	30 (6.1)	6 (1.2)
	Bilateral	66 (13.3)	84 (16.9)	0 (0.0)

B-reader Interstitial Abnormality Finding Comparison	Type of Agreement	Proportion	Exact 95% Confidence Interval
B vs. E	Agreement	188 / 496 = 0.38	(0.34, 0.42)
	Some Disagreement	213 / 496 = 0.43	(0.39, 0.47)
	Extreme Disagreement	95 / 496 = 0.19	(0.16, 0.23)

Table 18a. Comparing UDP between B-reader C and B-reader D when reviewing the same x-rays regardless of whether a first or second stage evaluation.

		B-reader D's UDP		
		None n (%)	BPD n (%)	BILD n (%)
B-reader C's UDP	None	67 (29.3)	126 (55.0)	0 (0.0)
	BPD	3 (1.3)	23 (10.0)	0 (0.0)
	BILD	3 (1.3)	7 (3.1)	0 (0.0)

B-reader UDP Comparison	Type of Agreement	Proportion	Exact 95% Confidence Interval
C vs. D	Agreement	90 / 229 = 0.39	(0.33, 0.46)
	Disagreement	139 / 229 = 0.61	(0.54, 0.67)

Table 18b. Comparing Pleural Abnormality Findings between B-reader C and B-reader D when reviewing the same x-rays regardless of whether a first or second stage evaluation.

		B-reader D's Pleural Abnormality Finding		
		None n (%)	Some n (%)	Bilateral n (%)
B-reader C's Pleural Abnormality Finding	None	32 (14.0)	36 (15.7)	123 (53.7)
	Some	0 (0.0)	1 (0.4)	9 (3.9)
	Bilateral	3 (1.3)	1 (0.4)	24 (10.5)

B-reader Pleural Abnormality Finding Comparison	Type of Agreement	Proportion	Exact 95% Confidence Interval
C vs. D	Agreement	57 / 229 = 0.25	(0.19, 0.31)
	Some Disagreement	46 / 229 = 0.20	(0.15, 0.26)
	Extreme Disagreement	126 / 229 = 0.55	(0.48, 0.62)

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Table 18c. Comparing Interstitial Abnormality Findings between B-reader C and B-reader D when reviewing the same x-rays regardless of whether a first or second stage evaluation.

		B-reader D's Interstitial Abnormality Finding		
		None n (%)	Some n (%)	Bilateral n (%)
B-reader C's Interstitial Abnormality Finding	None	200 (87.3)	19 (8.3)	0 (0.0)
	Some	0 (0.0)	0 (0.0)	0 (0.0)
	Bilateral	6 (2.6)	4 (1.8)	0 (0.0)

B-reader Interstitial Abnormality Finding Comparison	Type of Agreement	Proportion	Exact 95% Confidence Interval
C vs. D	Agreement	200 / 229 = 0.87	(0.82, 0.91)
	Some Disagreement	23 / 229 = 0.10	(0.06, 0.15)
	Extreme Disagreement	6 / 229 = 0.03	(0.01, 0.06)

Table 19a. Comparing UDP between B-reader C and B-reader E when reviewing the same x-rays regardless of whether a first or second stage evaluation.

		B-reader E's UDP		
		None a (%)	BPD a (%)	BILD a (%)
B-reader C's UDP	None	66 (70.2)	8 (8.5)	12 (12.8)
	BPD	1 (1.1)	7 (7.5)	0 (0.0)
	BILD	0 (0.0)	0 (0.0)	0 (0.0)

B-reader UDP Comparison	Type of Agreement	Proportion	Exact 95% Confidence Interval
C vs. E	Agreement	73 / 94 = 0.78	(0.68, 0.86)
	Disagreement	21 / 94 = 0.22	(0.14, 0.32)

Table 19b. Comparing Pleural Abnormality Findings between B-reader C and B-reader E when reviewing the same x-rays regardless of whether a first or second stage evaluation.

		B-reader E's Pleural Abnormality Finding		
		None n (%)	Some a (%)	Bilateral a (%)
B-reader C's Pleural Abnormality Finding	None	72 (76.6)	2 (2.1)	10 (10.6)
	Some	0 (0.0)	2 (2.1)	0 (0.0)
	Bilateral	1 (1.1)	0 (0.0)	7 (7.5)

B-reader Pleural Abnormality Finding Comparison	Type of Agreement	Proportion	Exact 95% Confidence Interval
C vs. E	Agreement	81 / 94 = 0.86	(0.78, 0.92)
	Some Disagreement	2 / 94 = 0.02	(0.00, 0.07)
	Extreme Disagreement	11 / 94 = 0.12	(0.06, 0.20)

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Table 19e. Comparing Interstitial Abnormality Findings between B-reader C and B-reader E when reviewing the same x-rays regardless of whether a first or second stage evaluation.

		B-reader E's Interstitial Abnormality Finding		
		None n (%)	Some n (%)	Bilateral n (%)
B-reader C's Interstitial Abnormality Finding	None	60 (63.8)	22 (23.4)	12 (12.8)
	Some	0 (0.0)	0 (0.0)	0 (0.0)
	Bilateral	0 (0.0)	0 (0.0)	0 (0.0)

B-reader Interstitial Abnormality Finding Comparison	Type of Agreement	Proportion	Exact 95% Confidence Interval
C vs. E	Agreement	60 / 94 = 0.64	(0.53, 0.73)
	Some Disagreement	22 / 94 = 0.23	(0.15, 0.33)
	Extreme Disagreement	12 / 94 = 0.13	(0.07, 0.21)

Table 20a. Comparing UDP between B-reader D and B-reader E when reviewing the same x-rays regardless of whether a first or second stage evaluation.

		B-reader E's UDP		
		None n (%)	BPD n (%)	BILD n (%)
B-reader D's UDP	None	161 (23.2)	19 (2.7)	61 (8.8)
	BPD	206 (29.7)	147 (21.2)	89 (12.8)
	BILD	3 (0.4)	8 (1.2)	0 (0.0)

B-reader UDP Comparison	Type of Agreement	Proportion	Exact 95% Confidence Interval
D vs. E	Agreement	308 / 694 = 0.44	(0.41, 0.48)
	Disagreement	386 / 694 = 0.56	(0.52, 0.59)

Table 20b. Comparing Pleural Abnormality Findings between B-reader D and B-reader E when reviewing the same x-rays regardless of whether a first or second stage evaluation.

		B-reader E's Pleural Abnormality Finding		
		None n (%)	Some n (%)	Bilateral n (%)
B-reader D's Pleural Abnormality Finding	None	72 (10.4)	3 (0.4)	13 (1.9)
	Some	111 (16.0)	26 (3.8)	18 (2.6)
	Bilateral	197 (28.4)	57 (8.2)	197 (28.4)

B-reader Pleural Abnormality Finding Comparison	Type of Agreement	Proportion	Exact 95% Confidence Interval
D vs. E	Agreement	295 / 694 = 0.43	(0.39, 0.46)
	Some Disagreement	189 / 694 = 0.27	(0.24, 0.31)
	Extreme Disagreement	210 / 694 = 0.30	(0.27, 0.34)

Table 20c. Comparing Interstitial Abnormality Findings between B-reader D and B-reader E when reviewing the same x-rays regardless of whether a first or second stage evaluation.

| | | B-reader E's Interstitial Abnormality Finding | | |
		None n (%)	Some n (%)	Bilateral n (%)
B-reader D's Interstitial Abnormality Finding	None	303 (43.7)	196 (28.2)	134 (19.3)
	Some	23 (3.3)	11 (1.6)	16 (2.3)
	Bilateral	9 (1.3)	2 (0.3)	0 (0.0)

B-reader Interstitial Abnormality Finding Comparison	Type of Agreement	Proportion	Exact 95% Confidence Interval
D vs. E	Agreement	314 / 694 = 0.45	(0.41, 0.49)
	Some Disagreement	237 / 694 = 0.34	(0.31, 0.38)
	Extreme Disagreement	143 / 694 = 0.21	(0.18, 0.24)

Appendix A: Contains Five Additional Tables and Subtables

Table 1

Categorization Criteria. The criteria that a claim must meet to receive an offer for the Scheduled Value for one of the seven Scheduled Disease categories are as follows:

Category I: Bilateral Pleural Disease (Scheduled Value: $12,000)

1.   The claimant must document bilateral pleural disease (plaques or thickening) diagnosed on the basis of x-ray, CAT scan, or high resolution CAT scan; and

2.   The proof of claim must establish a 10-year latency period between the date of first exposure to asbestos and the date of diagnosis of bilateral pleural disease; and

3.   The proof of claim must identify exposure to Manville asbestos products.

Category II: Nondisabling Bilateral Interstitial Lung Disease (Scheduled Value:$25,000)

1.   The claimant must document bilateral interstitial lung disease diagnosed on the basis of x-ray, CAT scan, or high resolution CAT scan, and submit either:

a.   A medical report stating that a causal relationship exists between asbestos exposure and the bilateral interstitial lung disease; or

b.   Documentation of the presence of either unilateral or bilateral pleural disease accompanying the bilateral interstitial lung disease; and

2.   The proof of claim must establish a 10-year latency period between the date of first exposure to asbestos and the date of diagnosis of bilateral interstitial disease; and

3.   The proof of claim must identify exposure to Manville asbestos products.

Category III: Disabling Bilateral Interstitial Lung Disease (Scheduled Value: $50,000)

1.   The claimant must document bilateral interstitial lung disease diagnosed on the basis of x-ray, CAT scan, or high resolution CAT scan; and

2.   The claimant must document disability or impairment evidenced by pulmonary function tests (PFTs), total lung capacity (TLC), forced vital capacity (FVC), or diffusing capacity (DLCO)) of less than 80%; and

3.   The claimant must submit a medical report stating that a causal relationship exists between asbestos exposure and the bilateral interstitial lung disease; and

4.   The proof of claim must establish a 10-year latency period between the date of first exposure to asbestos and the date of diagnosis of bilateral interstitial disease; and

5.   The proof of claim must identify exposure to Manville asbestos products.

Category IV: Other Cancers (Scheduled Value: $40,000)

1.   The claimant must demonstrate by medical report the existence of primary asbestos-related cancer of one of the following sites:

a.   Colo-rectal;
b.   Laryngeal;
c.   Esophageal; or
d.   Pharyngeal; and

2.   The claimant must demonstrate by medical report the existence of one of the following:

a.   Bilateral interstitial lung disease;
b.   Bilateral pleural disease (thickening or plaques); or
c.   Pathological evidence of asbestosis; and

3.   The proof of claim must establish a 10-year latency period between the date of first exposure to asbestos and the date of diagnosis of the cancer; and

4.   The proof of claim must identify exposure to Manville asbestos products.

Category V: Lung Cancers (One): (Scheduled Value: $60,000)

1.   The claimant must demonstrate by medical report the existence of primary asbestos-related cancer of the lung; and

2.   The claimant must demonstrate at least 15 years of heavy occupational exposure to asbestos-containing materials in employment regularly requiring work in the immediate area of visible asbestos dust; and

3.   The proof of claim must establish a 10-year latency period between the date of first exposure to asbestos and the date of diagnosis of the cancer; and

4.   The proof of claim must identify exposure to Manville asbestos products.

Category VI: Lung Cancers (Two) (Scheduled Value: $90,000)

1.   The claimant must demonstrate by medical report the existence of primary asbestos-related cancer of the lung; and

2.   The proof of claim must establish a 10-year latency period between the date of first exposure to asbestos and the date of diagnosis of the cancer; and

3.   The proof of claim must identify exposure to Manville asbestos products; and

4.   The claimant must:

a.   Be a nonsmoker (has not smoked cigarettes for at least 15 years prior to diagnosis), and demonstrate by documentation, such as Social Security records or a medical report with claimant's work history, occupational exposure to asbestos during an aggregate of three years or 12 quarters of employment[2] or

b.   Demonstrate by medical report the existence of one of the following:

(1)   Bilateral interstitial lung disease;
(2)   Bilateral pleural disease (thickening or plaques); or
(3)   Pathological evidence of asbestosis.

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[2]   Daily exposure during such period of time is not required.

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<u>Category VII: Malignant Mesothelioma</u> (Scheduled Value: $200,000)

1.   The claimant must demonstrate by medical report referencing pathological findings the existence of malignant mesothelioma; and

2.   The proof of claim must establish a 10-year latency period between the date of first exposure to asbestos and the date of diagnosis of the cancer; and

3.   The proof of claim must identify exposure to Manville asbestos products.

Table 2. All Information Available for Analysis

Variable	Definition
poc	unique number assigned to each Proof of Claim
poc_yr	year claim was filed against the Trust
fifo_yr	earlier of year claim was filed against any defendant or the Trust
dob	claimant's date of birth
diag_dt	alleged date of diagnosis
dx_age	age of claimant at time of alleged diagnosis (diag_dt - dob)
yr_expos	claimant's alleged first year of exposure to asbestos
duration	alleged number of years claimant was exposed to asbestos
njobs	number of jobs claimant has held
firm	name of the law firm representing the claimant
rptstate	state of jurisdiction, if available, or claimant's state of residence
indus_cd	claimant's alleged primary exposure industry
category	The Trust's pre-audit classification of the claimant's injury
cur_cat	Trust's post-audit classification of the claimant's injury
group	group code assigned to the claim when it was placed in medical audit
rel_code	reason why the claim was released from medical audit
releasdt	date claim released from medical audit
cat_doc	claimant's doctor as identified by the Trust during the Trust's categorization of the injury
med_doc	claimant's doctor as identified by the Trust during the Trust's entering the claim into the Trust's medical audit claim profile system
doc	claimant's doctor as identified by cat_doc if not missing; otherwise, med_doc used
b_reader	whether the claimant's physician was a certified B-reader or not
xray_1	date x-ray taken (as noted by the first stage MA B-reader)
xrev1_id	ID of the first stage MA B-reader

Table 2. All Information Available for Analysis

Variable	Definition
flmqual1	film quality as assigned by the first stage MA B-reader
filmneg1	determination by the first stage MA B-reader as to whether the film was negative
par_abn1	presence of parenchymal abnormalities as determined by the first stage MA B-reader
plr_abn1	presence of pleural abnormalities as determined by the first stage MA B-reader
rv_ilo1	ILO classification assigned by the first stage MA B-reader to the x-ray
results1	results (upgrade, same, unreadable, downgrade) of the first stage B-reading
xray_2	date x-ray taken (as noted by the second stage MA B-reader)
xrev2_id	ID of the second stage MA B-reader
flmqual2	film quality as assigned by the second stage MA B-reader
filmneg2	determination by the second stage MA B-reader as to whether the film was negative
par_abn2	presence of parenchymal abnormalities as determined by the second stage MA B-reader
plr_abn2	presence of pleural abnormalities as determined by the second stage MA B-reader
rv_ilo2	ILO classification assigned by the second stage MA B-reader to the x-ray
results2	results (upgrade, same, unreadable, downgrade) of the second stage B-reading
orig_q3	The Trust's pre-audit assessment of claim using a core question asking whether pleural disease was documented by x-ray or CT scan in a non-malignancy claim
orig_q4	The Trust's pre-audit assessment of claim using core question asking whether bilateral interstitial lung disease was documented by x-ray or CT scan in a non-malignancy claim

Table 2. All Information Available for Analysis

Variable	Definition
orig_q12	The Trust's pre-audit assessment of claim using core questions asking whether bilateral-pleural disease was present in a malignancy claim
orig_q13	The Trust's pre-audit assessment of claim using core question asking whether bilateral interstitial lung disease was present in a malignancy claim
orig_udp	The Trust's pre-audit assessment of the underlying disease process based on core questions: orig_q3, orig_q4, orig_q12, and orig_q13

Table 3.   Ranking of 70 Law Firms by Rate of No Dispute Over the Disease Process: Key B-reader vs. Claimant

Law Firm	Number of Cases	Raw Rank	Raw Rate of No Dispute	Adjusted Rank
144	28	1	0.25000	2
114	55	2	0.25455	6
130	27	3	0.25926	3
160	140	4	0.26429	1
199	43	5	0.27907	11
121	210	6	0.29048	4
112	36	7	0.30556	8
172	20	8	0.35000	9
84	54	9	0.35185	5
122	151	10	0.35762	14
198	109	11	0.35780	7
110	63	12	0.36508	12
48	27	13	0.37037	10
19	20	14	0.40000	16
44	22	15	0.40909	17
26	58	16	0.41379	13
23	31	17	0.41935	20
133	92	18	0.44565	24
156	60	19	0.45000	15
175	130	20	0.45385	21
58	151	21	0.45695	19
167	59	22	0.47458	22
177	239	23	0.48117	18
200	33	24	0.51515	26
195	69	25	0.52174	32
126	143	26	0.53846	28
193	49	27	0.55102	30
13	36	28	0.55556	23
196	130	29	0.56154	31
111	165	30	0.56970	38
161	21	31	0.57143	27
169	274	32	0.57299	37
55	61	33	0.57377	39
11	47	34	0.57447	29
131	110	35	0.58182	40
141	90	36	0.58889	46
10	22	37	0.59091	42
129	27	38	0.59259	35
108	32	39	0.59375	25
152	53	40	0.60377	45

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Table 3.   Ranking of 70 Law Firms by Rate of No Dispute Over the Disease Process:
Key B-reader vs. Claimant

Law Firm	Number of Cases	Raw Rank	Raw Rate of No Dispute	Adjusted Rank
73	28	41	0.60714	33
134	57	42	0.61404	36
75	123	43	0.62602	34
94	111	44	0.63063	43
20	25	45	0.64000	41
3	207	46	0.64734	47
164	20	47	0.65000	44
90	32	48	0.65625	51
65	37	49	0.67568	48
37	22	50	0.68182	49
149	55	51	0.69091	50
62	27	52	0.70370	55
22	66	53	0.71212	52
102	23	54	0.73913	53
178	46	55	0.76087	57
56	21	56	0.76190	54
28	30	57	0.76667	56
109	53	58	0.77358	58
138	261	59	0.77778	63
17	73	60	0.78082	66
79	100	61	0.79000	60
98	41	62	0.80488	59
7	21	63	0.80952	62
29	51	64	0.82353	64
166	23	65	0.82609	61
53	27	66	0.85185	65
38	42	67	0.88095	67
154	103	68	0.88350	69
5	52	69	0.90385	68
137	33	70	0.93939	70

Figure 1. Ranking of 70 Law Firms by Rate of No Dispute
Over the Disease Process: Key B-reader vs. Claimant

Low
Dispute

Ranking of 70 Law Firms (n=20+)

Raw
Data

Adjusted Rate
(Controlling For

jth
Disput
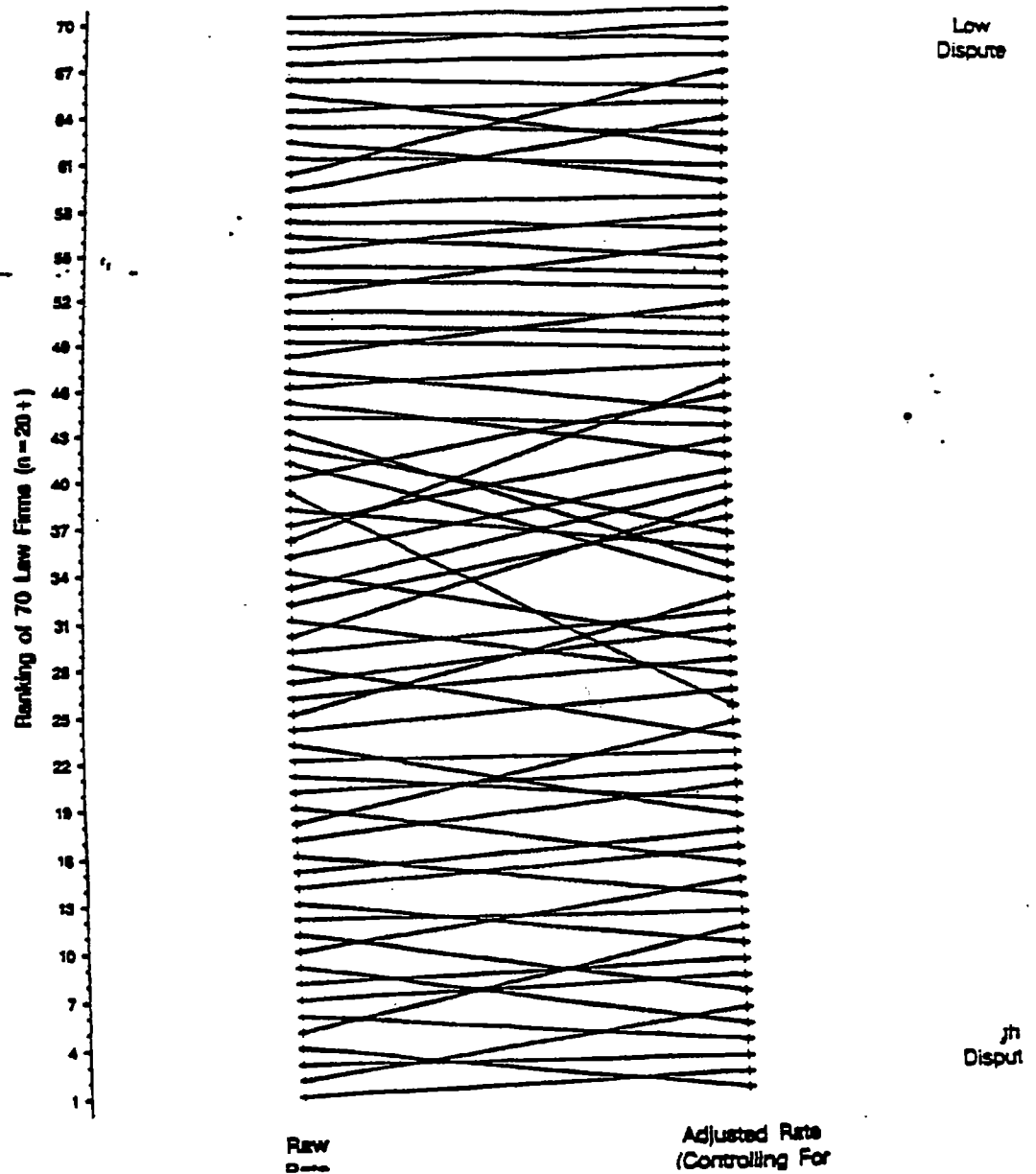
CRMC 0116819

Table 4. Ranking of 50 Physicians by Rate of No Dispute Over the Disease Process: Key B-reader vs. Claimant

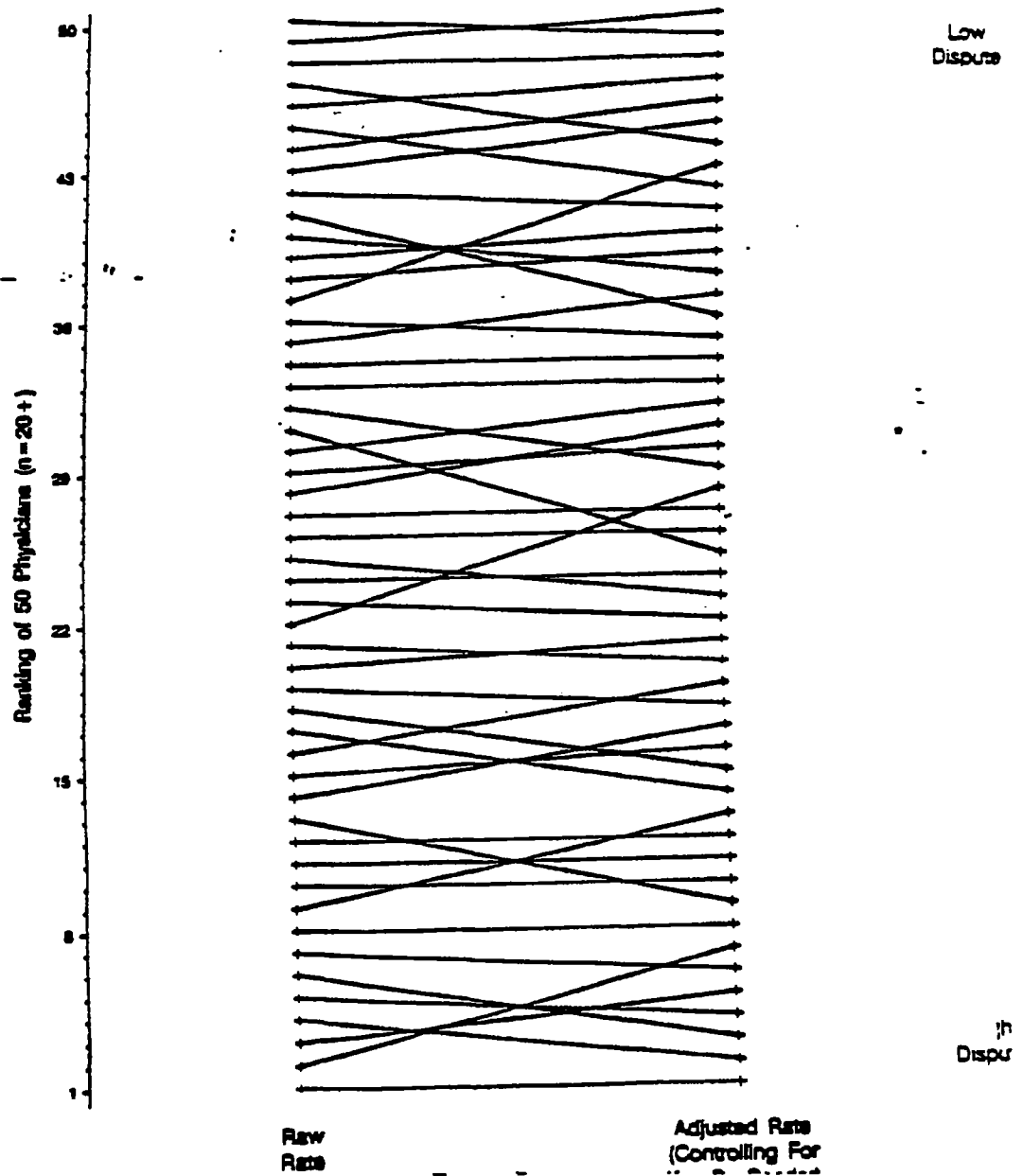| Claimant's Physician	Number of Cases	Raw Rank	Raw Rate of No Dispute	Adjusted Rank
496	72	1	0.20833	:
212	36	2	0.22222	:
355	28	3	0.25000	5
328	166	4	0.28313	2
407	272	5	0.29412	4
246	38	6	0.31579	3
531	61	7	0.32787	6
370	30	8	0.33333	8
420	22	9	0.36364	13
526	84	10	0.36905	10
96	29	11	0.37931	11
122	26	12	0.38462	12
419	224	13	0.40625	9
131	26	14	0.42308	17
367	26	15	0.42308	16
492	101	16	0.42574	19
40	54	17	0.44444	14
200	717	18	0.46025	15
90	32	19	0.46875	18
437	44	20	0.50000	21
234	346	21	0.52023	20
186	43	22	0.53488	28
128	93	23	0.53763	22
256	54	24	0.55556	24
466	21	25	0.57143	23
471	240	26	0.58333	26
35	61	27	0.60656	27
65	56	28	0.60714	31
195	86	29	0.62791	30
145	27	30	0.62963	32
525	22	31	0.63636	25
150	42	32	0.64286	29
520	118	33	0.64407	33
322	34	34	0.64706	34
314	21	35	0.71429	37
13	25	36	0.72000	35
81	26	37	0.73077	43
472	24	38	0.75000	39
305	77	39	0.75325	40
250	45	40	0.77778	38
220	23	41	0.78261	36
415	33	42	0.78788	41

Table 4.   Ranking of 50 Physicians by Rate of No Dispute Over the Disease Process:
Key B-reader vs. Claimant

Claimant's Physician	Number of Cases	Raw. Rank	Raw Rate of No Dispute	Adjusted Rank
308	38	43	0.78947	45
209	88	44	0.79545	46
166	79	45	0.79747	42
604	49	46	0.81633	47
211	22	47	0.81818	44
268	21	48	0.85714	48
348	260	49	0.92692	50
337	48	50	0.93750	49

Figure 2. Ranking of 50 Physicians by Rate of No Dispute
Over the Disease Process: Key B-reader vs. Claimant

Low
Dispute

Ranking of 50 Physicians (n=20+)

Raw
Rate

Adjusted Rate
(Controlling For

Dispu

CRMC 0116822

Table 5.   Ranking of 120 Law Firm-Physician Combinations by Rate of No Dispute Over the Disease Process: Key B-reader vs. Claimant

| Law Firm	Claimant's Physician	Number of Cases	Raw Rank	Raw Rate of No Dispute	Adjusted Rank
121	328	24	1	0.12500	1
122	131	16	2	0.12500	2
114	407	33	3	0.18182	9
144	246	11	4	0.18182	5
122	520	26	5	0.19231	6
130	370	15	6	0.20000	8
121	407	124	7	0.20161	4
160	496	72	8	0.20833	3
199	212	35	9	0.22857	14
152	234	25	10	0.24000	10
114	69	12	11	0.25000	28
160	355	28	12	0.25000	12
58	96	10	13	0.30000	17
84	200	41	14	0.31707	7
112	407	22	15	0.31818	24
110	531	47	16	0.31915	13
156	200	43	17	0.34884	11
198	328	104	18	0.35577	15
172	246	14	19	0.35714	16
144	407	11	20	0.36364	26
58	526	60	21	0.36667	23
19	200	19	22	0.36842	19
26	200	48	23	0.37500	21
48	407	21	24	0.38095	20
167	233	13	25	0.38462	31
167	313	13	26	0.38462	33
177	419	179	27	0.39665	18
160	367	15	28	0.40000	39
175	40	30	29	0.40000	22
193	195	12	30	0.41667	25
122	492	101	31	0.42574	42
175	234	46	32	0.43478	29
111	200	93	33	0.44086	37
55	419	27	34	0.44444	47
133	471	90	35	0.44444	52
23	531	11	36	0.45455	32
58	35	11	37	0.45455	36
126	200	94	38	0.45745	27
183	419	13	39	0.46154	30
141	407	41	40	0.46341	48

Table 5.   Ranking of 120 Law Firm-Physician Combinations by Rate of No Dispute Over the Disease Process: Key B-reader vs. Claimant

Law Firm	Claimant's Physician	Number of Cases	Raw Rank	Raw Rate of No Dispute	Adjusted Rank
169	200	183	41	0.46448	41
175	128	30	42	0.46667	46
195	65	15	43	0.46667	49
58	370	10	44	0.50000	45
107	489	10	45	0.50000	44
110	420	12	46	0.50000	62
167	90	28	47	0.50000	35
195	186	17	48	0.52941	71
20	476	15	49	0.53333	60
193	470	13	50	0.53846	65
200	40	13	51	0.53846	61
13	200	33	52	0.54545	34
94	128	33	53	0.54545	56
79	145	20	54	0.55000	55
196	234	121	55	0.55372	54
58	256	54	56	0.55556	64
73	525	18	57	0.55556	50
3	200	157	58	0.56051	67
149	604	16	59	0.56250	68
195	407	16	60	0.56250	40
121	234	14	61	0.57143	63
161	234	21	62	0.57143	43
177	466	21	63	0.57143	59
193	128	21	64	0.57143	57
175	195	22	65	0.59091	80
17	430	15	66	0.60000	88
26	471	10	67	0.60000	51
108	471	28	68	0.60714	38
10	316	18	69	0.61111	77
94	234	49	70	0.61224	70
75	17	13	71	0.61538	58
188	250	13	72	0.61538	53
134	35	41	73	0.63415	74
22	13	11	74	0.63636	69
97	323	11	75	0.63636	78
126	166	20	76	0.65000	66
141	65	20	77	0.65000	83
178	415	16	78	0.68750	76
75	234	29	79	0.68966	75
111	471	42	80	0.69048	91

Table 5.   Ranking of 120 Law Firm-Physician Combinations by Rate of No Dispute Over the Disease Process: Key B-reader vs. Claimant

Law Firm	Claimant's Physician	Number of Cases	Raw Rank	Raw Rate of No Dispute	Adjusted Rank
129	232	10	81	0.70000	⁻9
138	314	20	82	0.70000	82
195	211	10	83	0.70000	84
37	150	14	84	0.71429	81
89	305	14	85	0.71429	86
62	348	11	86	0.72727	93
146	520	11	87	0.72727	72
169	81	15	88	0.73333	97
79	348	19	89	0.73684	89
169	471	19	90	0.73684	87
88	471	12	91	0.75000	73
178	322	12	92	0.75000	94
109	520	25	93	0.76000	90
56	514	13	94	0.76923	92
75	220	23	95	0.78261	85
138	308	38	96	0.78947	104
126	471	24	97	0.79167	101
138	209	88	98	0.79545	108
29	520	43	99	0.81395	107
53	13	11	100	0.81818	96
98	305	28	101	0.82143	98
111	166	29	102	0.82759	99
166	55	12	103	0.83333	95
17	268	21	104	0.85714	110
121	225	14	105	0.85714	105
169	166	29	106	0.86207	102
30	250	17	107	0.88235	100
38	472	18	108	0.88889	109
5	415	10	109	0.90000	103
138	634	12	110	0.91667	106
137	348	13	111	0.92308	111
152	348	26	112	0.92308	115
38	604	15	113	0.93333	113
3	337	47	114	0.93617	118
169	604	17	115	0.94118	117
28	348	20	116	0.95000	114
154	348	80	117	0.95000	120
5	348	33	118	0.96970	119
91	250	10	119	1.00000	112
149	348	16	120	1.00000	116

Figure 3.   Ranking of 120 Law Firm–Physician Combinations by Rate of No Dispute
Over the Disease Process: Key B–reader vs. Claimant

Low
Dispute

Ranking of 120 Law Firm–Physician Combinations (n=10+¹)

Raw
Rate

Adjusted Rate
(Controlling For
Key B–reader)
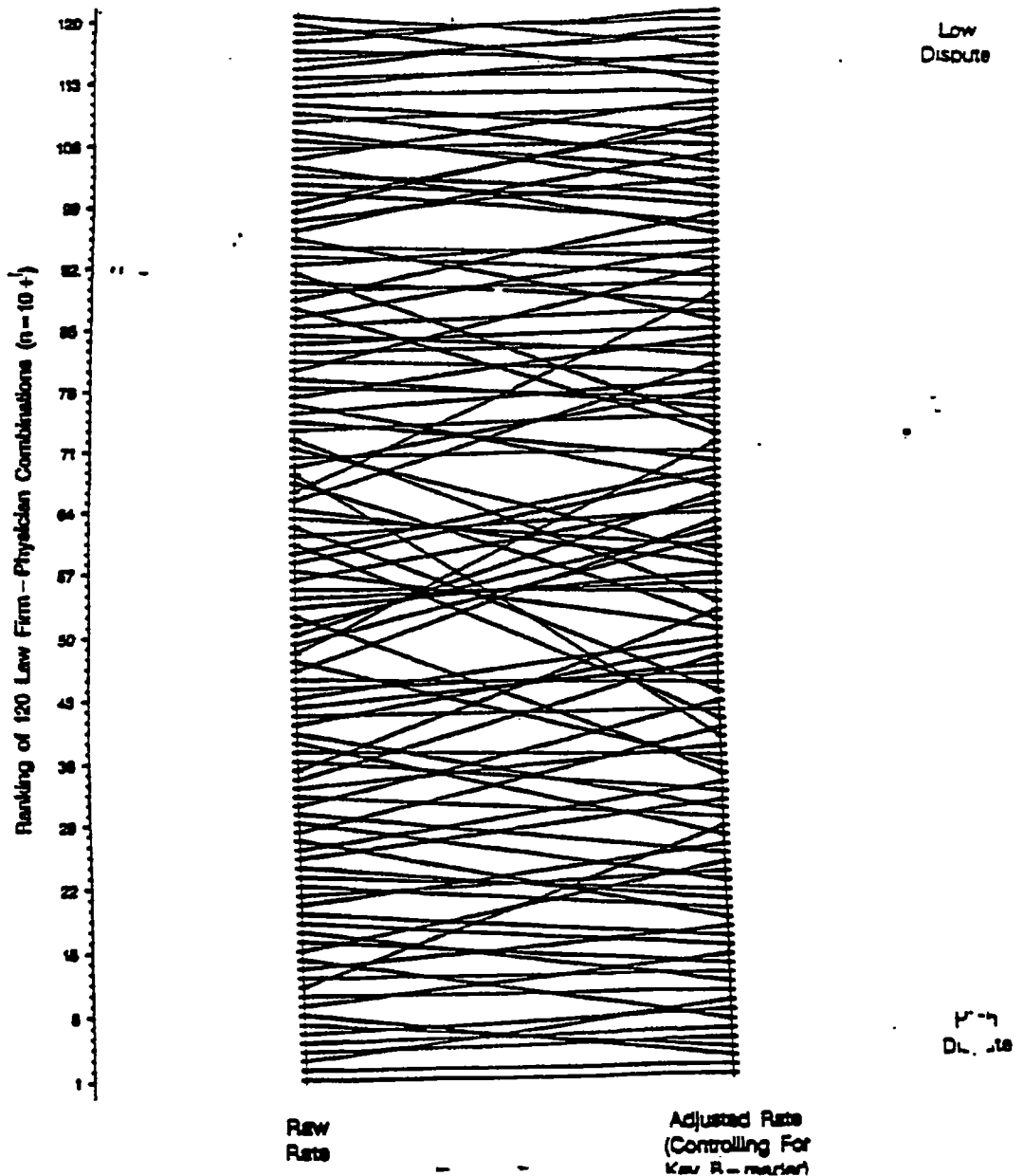
CRMC_0116826

Table 6

Simple Steps to Adjust for Maldistribution of Key B-readers in Assignment to Claims

This process is called "indirect standardization." It is old and well-accepted. All of the analysis that we have done previously is called "model-based indirect standardization"—it adjusts for many factors. We have added another component—a mixed effects model—that goes many steps farther. It adjusts for small samples and anticipates regression to the mean. These methods fall apart when the numbers of cases per law firm are small. Here we use some hypothetical data to demonstrate the process.

Table 6 — Step 1: Calculate the definition of agreement (this can change depending on Trust's needs).

Table 6 — Step 2: Calculate overall rate of non dispute using Key B-readers.

For this example, we use data with an overall rate of no dispute of 57% (3221 / 5661).

Table 6 — Step 3: Test whether an individual law firm has unusual mix of Key B-reader.

| | Key B-reader | | | | | |
	A	B	C	D	E	Total
All Other Law Firms	1305	1863	229	1512	601	5510
(row %)	24%	34%	4%	27%	11%	
Example Law Firm	20	39	0	54	38	151
(row %)	13%	26%	0%	36%	25%	

This table shows a high degree of imbalance in the assignment of Key B-readers to the example law firm. The imbalance is reflected in a statistically significant chi-square statistic 46, df=4, p<0.001. When such an imbalance occurs, one must be concerned about whether the raw rate of dispute/no dispute is confounded by the differences in the rates of dispute found by different Key B-readers.

If this chi-square statistic is a low value, and if the p-value is high, then there is no statistically significant maldistribution of B-readers for the law firm. A typical p-value to use as a critical value is p=0.05. If the law firm has a large number of cases, this test will be able to detect a departure from a random distribution of B-readers. So, you can adopt a rule that if p>0.05 then there is no maldistribution, for example, then STOP HERE. Do not adjust the law firm's rate of agreement.

If p is small (chi-square statistic is large), then proceed to step (4) because there is likely

confounding of the raw rate of agreement by the Key B-reader.

Table 6 — Step 4: Calculate raw observed rates by Key B-reader for the example firm.

		Dispute		
		Yes n (row %)	No n (row %)	Total
	A	9 (45)	11 (55)	20
Key B-reader	B	30 (77)	9 (23)	39
	C	0 (0)	0 (0)	0
	D	38 (70)	16 (30)	54
	E	20 (53)	18 (47)	38
	Total	97 (64)	54 (36)	151

The chi-square statistic for this law firm is 9.0, df=4, p=0.03, meaning that for this law firm, the rates of agreement differ substantially by Key B-reader, because the p-value is small. It also gives the observed law firm-wide rate of agreement 54 / 151 = 0.36.

Table 6 — Step 5: Calculate overall rate when B-reader is the Key reader for all claims from all law firms.

		Dispute		
		Yes n (row %)	No n (row %)	Total
	A	458 (35)	867 (65)	1325
Key B-reader	B	587 (31)	1315 (69)	1902
	C	166 (72)	63 (28)	229
	D	888 (57)	678 (43)	1566
	E	341 (53)	298 (47)	639
	Total	2440 (43)	3221 (57)	5661

The row percentage is the expected rate of dispute/no dispute for each Key B-reader.
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Table 6 — Step 6: Calculate the adjusted rates for the example law firm.

(a) Calculate the expected number of agreed claims for each B-reader for the example law firm:

Thus, the expected number of non disputed claims for a given law firm = overall no dispute rate × number of claims filed by the given law firm.

B-reader	Overall × No Dispute Rate (Step 5)	number cases = filed by law firm (Step 4)	Expected Number of Non Disputed Claims for the Law Firm
A	0.65	20	13.0
B	0.69	39	26.9
C	0.28	0	0.0
D	0.43	54	23.2
E	0.47	38	17.9
Sum		151	81.0

(b) Calculate the standardized or adjusted rate of agreement for the example law firm:

Adjusted Rate = (Observed Agreed Cases / Expected Agreed Cases) × Overall Rate
                (step 4)   (step 6a)   (step 2)

= (54 / 81) × 0.57

= 0.67 × 0.57

= 0.38

= 38%. The adjusted rate of no dispute for this example law firm.

Thus, the raw rate of agreement for this law firm is 36% (from step 4), but with an adjustment for the maldistribution of B-readers, the adjusted rate increases to 38%.

Table 6 — Step 7: Calculating a confidence interval to the adjusted rate.

One can estimate a confidence interval for the adjusted rate as follows by using the results in step 6(b).

In this example, observed agreed cases (no dispute) (O) = 54 (step 4). Expected (E) = 81 (step 6(a)), and the overall rate (r) = 0.57 (step 2).

Then the confidence interval is:

Adjusted Rate $\pm$ z $\times$ (sqrt(O) / E) $\times$ r^4, where z is appropriate inverse normal, e.g., to find a 95% confidence interval, z=1.96.

Lower Confidence Limit = 0.38 − 1.96 × (7.35 / 81) × 0.325)
            = 0.38 − 0.058
            = 0.32

Upper Confidence Limit = 0.38 + 0.058
            = 0.44

So, the adjusted rate (95% CI) is: 38% (32% to 44%).

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